

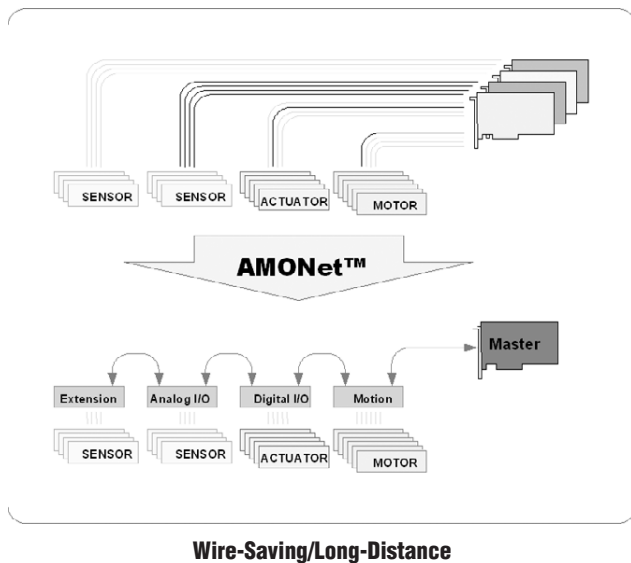
# Overview

## Complete Application-Ready Platforms for General Motion Control Tasks

Since the release of motion control cards in the 1990's, Advantech has been developing various types of motion control cards for users worldwide. Today, Advantech is still focused on providing the most robust, cost-effective and application-ready platforms for General Motion Control (GMC).

Advantech offers application-ready platforms that range from industrial workstations and industrial-grade CPUs, to motion control, encoder input and isolated I/O cards for general motion control (GMC) applications such as SMT/PCB, semiconductor and LCD manufacturing machinery. Advantech provides a full-range of industrial computing platforms that include high-brightness LCD displays, keypads, up to 20-slot backplanes and redundant power supplies for machine builders.

Advantech motion control solutions have 3-axis, 4-axis and 6-axis inputs with pulse-type and voltage-pulse models and the AMONet series of distributed motion modules. Furthermore, these cards are supported by complete motion control libraries under Windows OS, which are widely applied in GMC applications.



## AMONet - Advantech Distributed Motion Control Solutions

Motion control is growing in complexity as the number of axes in newly developed machines with motion control increases each year. Distance is also becoming an issue, as motors are located further and further away from the host computer. AMONet (Advantech Motion Network) was engineered to tackle the problems of increasing spending on wiring and maintenance of these complex motion control systems, and it also gets rid of distance limitations.

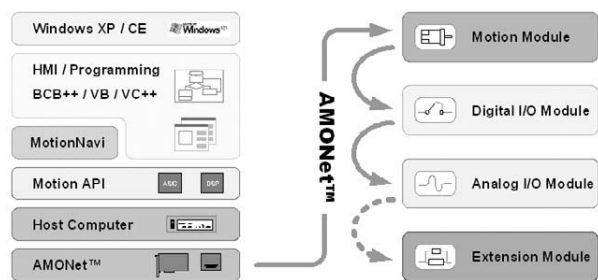
The first series of distributed motion control products from Advantech are called the AMONet RS-485 Series. AMONet RS-485 products are categorized as Master cards or Slave modules. While the Master card is kept in the host PC, the slave modules can be distributed so that they are next to motor drivers on the factory floor. The communication speed between the AMONet RS-485 slave modules can be up to 20 Mbps. This makes it possible to scan 2048 I/O points within 1.04 ms (or 1024 I/O points in 0.56 ms). Furthermore, an AMONet RS-485 master will update the I/O status automatically, and map data into local memory. Software running on the host PC can then read the status by simply reading the onboard memory, so no polling of slave modules is necessary.

Each port of a master card can control up to 2048 I/O connections or 64 motion axes, so future extensions are easily implemented. The distance between a master card and its slave modules can be up to 100 meters, and this distance is covered with a low-cost Cat 5 network cable. In addition to saving wiring costs - debugging and maintenance is also simplified.

Another advantage of AMONet RS-485 is its compatibility with motor drivers from different vendors. Advantech provides specially designed wiring boards for popular motion drivers from vendors such as Panasonic, Mitsubishi and Yaskawa. This makes configuration easier, as pin-to-pin cables can be used. Having a selection of motor vendors can also be an advantage when sourcing of a certain motor is difficult.

Motion control and I/O functions with AMONet RS-485 use the same library. This unique feature saves time, as programmers do not need to study both a motion library and an I/O library. You can also connect to a manual pulse generator directly to adjust and calibrate the system without having to write programs first.

AMONet makes machine building with motion control easier. The savings made on wiring and programming effort, as well as the compatibility with a wide range of popular motors have already led to many requests for AMONet products. Advantech is not content with the current selection though. There are already plans to release more AMONet products based on PCI, PC/104, and 1-axis motion slave modules as well as DI/O slave modules.



System Architecture

## A Broad Array of Products for Centralized Motion Control

Advantech's full product offering can accommodate all your motion control needs. You can choose from 3-axis, 4-axis or 6-axis controllers, pulse-output or voltage-output, ISA-bus-based or PCI-bus-based, and standard PC-based or embedded in a system. The functions of the motion cards also vary, from high-end 3-axis circular interpolation cards to low-cost point-to-point motion devices. And if you cannot find a controller to meet your exact requirements for an embedded motion controller, then Advantech can design one to your specifications. We are ready to build cost-effective controllers to meet your criteria, whether it be adding digital I/O channels or changing connector styles, or perhaps changing CPU grade. With all the inherent costs, time and risks involved, there's no reason why you should design your own controller when you can instead rely on the expertise, cost-efficiency, experience and proven reliability of Advantech.

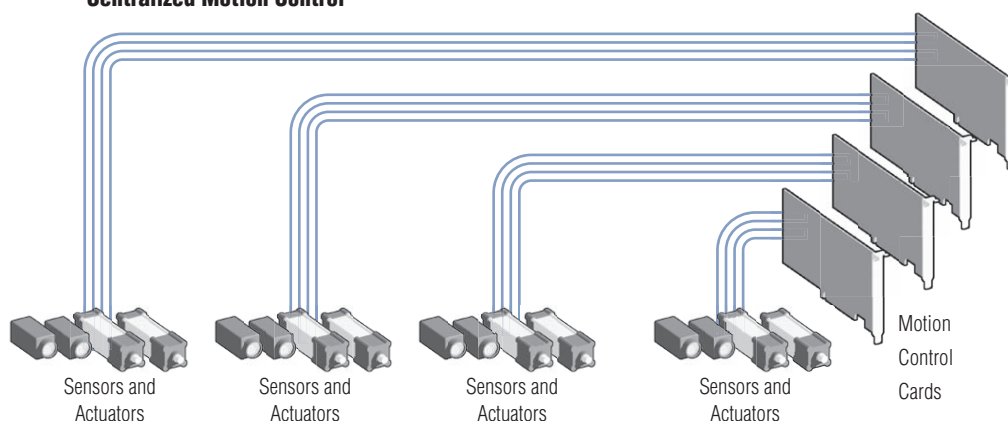
## The Differences Between Centralized & Distributed Motion Control

Machine control system architectures generally fall into two categories - centralized or distributed. In a centralized system, all control loops including logic, trajectory generation, and PID control, are executed on a single processor on a programmable automation controller (PAC). In a distributed system, the trajectory generation and logic control executes in the central processor, but the PID control loop is executed in the intelligent slave module. A distributed approach gives more processing power, while it reduces overall wiring cost and system complexity.

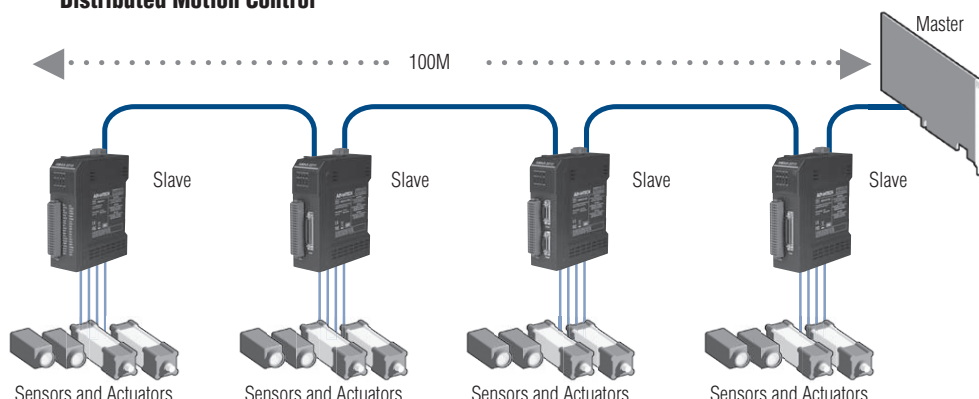
The Distributed Motion Control Products are categorized in two groups - Master Cards and Slave Modules. Communication between master and slave is based on a custom-engineered technology based on RS-485, which saves wires, transmits over long distances at high speeds, and have time-deterministic features.

The communication interface between master and host PC is based on memory mapping. Various functions can be chosen on the slave modules, and the industrial DIN-rail mountable design makes it easy to distribute them in the field. The master card collects information from slave modules and publishes the data to its host PC, and vice versa.

**Centralized Motion Control**



**Distributed Motion Control**



**Distributed Motion Control**

1	PAC & Software
2	BAS
3	UNO
4	RS-485 I/O
5	Ethernet I/O
6	TPC
7	IPPC
8	FPM
9	AWS
10	Plug-in I/O
11	CompactPCI
12	Signal Conditioning
13	USB I/O
14	Motion Control I/O
15	Ethernet Switch
16	EDG
17	ICOM

# Selection Guide

## Centralized Motion Control Cards

Bus		PCI					ISA		
Category		Pulse type			Voltage type	Encoder card	Pulse type		Encoder card
Model		PCI-1240U	PCI-1242	PCI-1243U	PCI-1241	PCI-1784U	PCL-839+	PCM-3240	PCL-833
Axes	Number of Axes	4	4	4	4	-	3	4	-
	Linear Interpolation	✓	✓	-	✓	-	-	✓	-
	2-axis Circle Interpolation	✓	✓	-	✓	-	-	✓	-
	Helical Interpolation	-	✓	-	✓	-	-	-	-
Advanced Functions	Encoder Channels	4	5	-	5	4	-	4	3
	Limit Switch Input Channels	8	8	8	8	-	6	8	-
	Home Input Channels	4	4	4	4	-	3	4	-
	Emergency Stop Input Channels	1	1	1	1	-	-	1	-
	Slow Down Limit Switches	8	-	8	-	-	6	8	-
	General Purpose DI Channels	-	-	8	-	4	16	-	2
	Servo On Output Channels	4	4	-	4	-	-	4	-
	General Purpose DO Channels	4	-	8	-	4	16	4	-
	BoardID Switch	✓	-	✓	-	✓	-	✓	-
	Position Compare Event	✓	✓	-	✓	-	-	-	-
Dimensions (mm)		175 x 100	175 x 100	175 x 100	175 x 100	175 x 100	185 x 100	96 x 90	185 x 100
Connectors		100-pin SCSI-II	68-pin SCSI-II	DB-62	68-pin SCSI-II	DB-37	1xDB-37 2 x 20-pin	2 x 50-pin IDC	1 x DB-25
Wiring Boards		ADAM-3952 ADAM-3952/J2S ADAM-3952/PMA	ADAM-3968	ADAM-3962 ADAM-3943	ADAM-3968	ADAM-3937	ADAM-3937 ADAM-3920	ADAM-3950 ADAM-3952 ADAM-3952/PMA ADAM-3952/J2S	ADAM-3925
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# AMAX-2050KW

## GX2-400 Machine Control Box with AMONet™ Interface

NEW



### Features

- Onboard AMD Geode™ GX2 processor, up to 256 MB onboard DDR
- 128 Kbyte battery backup RAM
- Supports AMONet™ series for remote motion control and data acquisition
- Two RS-232 and One RS-422/485 ports with automatic flow control
- One 10/100Base-T RJ-45 port and two USB ports
- Four programmable diagnostic LEDs, and one buzzer
- Design-in IP protection mechanism
- KW ready solution

## Introduction

Advantech's AMAX-2050KW is a Pentium® III grade platform with an onboard AMONet controller, which is designed for embedded machine automation applications. It provides special mechanism to protect machine builder's IP, also the self diagnostic function. From the peripheral point of view, with one AMONet, master port AMAX-2050KW can control up to 2048 I/O points and 64 axes. Also, AMAX-2050KW offers one LAN and dual USB interfaces to fulfill user's various communication needs. In addition, it also offers two RS-232 and one RS-422/485 communication port with automatic flow control functionality. Therefore, the AMAX-2050KW is an ideal solution for data gateway applications.

AMAX-2050KW supports Windows CE .NET, which offers a pre-configured image with optimized onboard device drivers. MULTIPROG supports all IEC 61131-3 programming languages. Depending on the task to be handled, your experience and company standards, you may choose one of the five standardized programming languages. The use of MULTIPROG offers you many advantages. As all essential data can be displayed in MULTIPROG, frequent switching between different tools during PLC programming and commissioning is no longer necessary. Observers guarantee data consistency with other tools, thus the engineering effort for the programming of PLCs is reduced.

## Specifications

### General

- **Certifications** CE
- **Dimensions (W x H x D)** 47.6 x 156 x 125 mm
- **Power Consumption** 8 W (Typical), 15 W (Max.)
- **Power Supply Spec.** Min. 15 W (9 ~ 36 V<sub>DC</sub>) (e.g. +24 V @ 625 mA)
- **OS Support** Windows® CE .NET 5.0

### System Hardware

- **CPU** AMD Geode GX2-400
- **Battery Backup RAM** 128 KB
- **Indicators** Power, CF, Alarm for RAM backup battery and 4 programmable diagnostic LEDs
- **Keyboard/Mouse** 1 x PS/2
- **Memory** 256MB DDR onboard
- **Storage** SSD: 1 x Internal (Master) & 1 x External (Slave) type I/II CompactFlash® slot
- **VGA** DB15 VGA connector
- **Watchdog Timer** Programmable

### Communications

- **Serial Ports** 2 x RS-232, 1 x RS-422/485  
Automatic RS-485 data flow control
- **Serial Port Speed** RS-232: 50 ~ 115.2 kbps  
RS-422/485: 50 ~ 921.6 kbps (Max.)
- **LAN** 1 x 10/100 Base-T RJ-45 ports
- **USB Ports** 2 x USB, UHCI, Rev. 1.1 compliant
- **AMONet Rings** 1 x Isolated AMONet, connect up to 2048 DIO channels or 64 motion axes

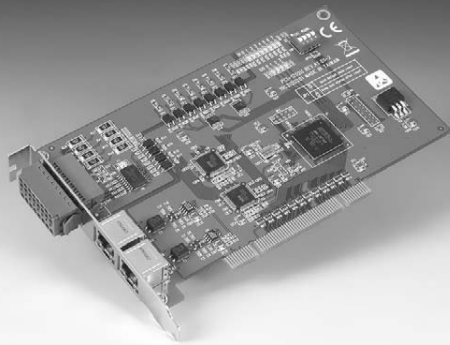
### Environment

- **Operating Humidity** 5 ~ 85% RH, non-condensing (refer to IEC 68-2-3)
- **Operating Temperature** 0 ~ 50° C

# PCI-1202U

## 2-port AMONet™ RS-485 Master Card

NEW



### Features

- Max. 20 Mbps transfer rate
- 2 independent AMONet™ RS-485 Master Rings
- Max. 128 AMONet RS-485 slave modules supported
- Programmable digital input to notify events
- Easy installation with RJ45 phone jack and LED diagnostic

### Introduction

PCI-1202U is a PCI interface card which supports two AMONet RS-485 master rings, and transfers data between host and slaves directly without any operations in between. Each ring can control up to 2048 I/O points, 64 axes, or a combination of I/O points and axes for motion control. The ring can support up to 20 Mbps transfer rate and a maximum communication distance of up to 100 meters.

The communication between master and slave is based on a customized RS-485 solution that saves wires, covers a long distance, supports high-speed communication and has time-deterministic features. The communication interface between master and host PC is accomplished by memory mapping. Various functions can be chosen on the slave modules, and standard industrial DIN-rail mounting design makes it easy to distribute them in the field. The master collects information from slave modules and publishes the information to its host PC.

### Specifications

#### AMONet RS-485 Motion Control

- **AMONet RS-485 Rings** 2
- **Interface** Half duplex RS-485
- **Cable Type** CAT5 UTP/STP Ethernet cable
- **Surge Protection** 10 kV
- **Transmission Speeds** 2.5, 5, 10, and 20 Mbps
- **Data Flow Control** Automatic
- **Communication Distance** 100 m @ 20 Mbps w/32 slave modules
- **Slave Module Support** Digital I/O, Motion Control, Analog I/O

#### Isolated Digital Input

- **Channels** 8
- **Input Voltage** Dry contact (but need External V<sub>cc</sub>)
- **Isolation Protection** 2,500 V<sub>DC</sub>
- **Input Resistance** 2.4 k $\Omega$  @ 0.5 W

#### Isolated Digital Output

- **Channels** 4
- **Output Type** Open collector
- **Isolation Protection** 2,500 V<sub>DC</sub>
- **Output Voltage** 5 ~ 30 V<sub>DC</sub>
- **Sink Current** 1 ch: Max. 1A  
4 ch: Max. 1.1 (total)

#### General

- **Bus Type** PCI V2.2
- **Certifications** CE
- **Connectors** RJ45 x 2

- **Dimensions** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** +5 V<sub>DC</sub> @ 0.5 A typical
- **Humidity** 5 ~ 95% RH, non-condensing (IEC 68-2-3)
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F)
- **Storing Temperature** -20 ~ 85° C (-4 ~ 185° F)

### Ordering Information

- **PCI-1202U** 2-port AMONet RS-485 Master Card
- **AMAX-2210** 1-axis AMONet RS-485 Motion Slave Module
- **AMAX-2211/PMA** 1-axis AMONet RS-485 Motion Slave Module for Panasonic Minas A
- **AMAX-2212/J2S** 1 axis AMONet RS-485 Motion Slave Module for Mitsubishi MR-J2S
- **AMAX-2213/YS2** 1-axis AMONet RS-485 Motion Slave Module for Yaskawa Sigma-II
- **AMAX-2241/PMA** 4-axis AMONet RS-485 Motion Slave Module for Panasonic Minas A
- **AMAX-2242/J2S** 4-axis AMONet RS-485 Motion Slave Module for Mitsubishi MR-J2S
- **AMAX-2243/YS2** 4-axis AMONet RS-485 Motion Slave Module for Yaskawa Sigma-II
- **AMAX-2752** 32-ch Isolated Digital Input Module
- **AMAX-2754** 32-ch Isolated Digital Output Module
- **AMAX-2756** 16/16-ch Isolated Digital Input/Output Module
- **AMAX-2730** 8/8-ch Isolated Digital Input/Output Module
- **AMAX-2710** 12-bit, 100kS/s, 16-ch Analog Input, 4-ch Analog Output Slave Module
- **PCL-10120M-2** SCSI 20-pin cable, 2 m (Optional for AMAX-2212/J2S)
- **PCL-10150M-2** SCSI 50-pin cable, 2 m (Optional for AMAX-2211/ PMA and AMAX-2213/YS2)

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